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TITLE: RUST PREVENTING AGENT FOR SURFACE OF IRON  
STEEL  
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INVENTOR-INFORMATION:

NAME  
HAYASHI, YUKIO  
FURUSAWA, TAKETOSHI  
HOSONO, TOSHIO

ASSIGNEE-INFORMATION:

NAME	COUNTRY
MITSUBISHI HEAVY IND LTD	N/A
SUGIMURA KAGAKU KOGYO KK	N/A

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ABSTRACT:

PURPOSE: To form a coating film excellent in adhesive strength and rust preventive ability by blending the specific quantity of a carboxyl group incorporating compound and an acrylic ester-ethylene copolymer resin with a tannic acid aq. solution.

CONSTITUTION: A treating agent for preventing rust is prepared by blending 4-10% one or more kinds of a carboxyl group incorporating compound selected from glycolic acid, gluconic acid, lactic acid, malic acid, formic acid, citric acid, tartaric acid, glutaric acid, succinic acid and these salts and 20-30%

acrylic ester ethylene copolymer resin. The treating agent for preventing rust is capable of forming a coating film incorporating the chemically stable resin, dense, strong in adhesive strength and excellent in rust preventive ability only by applying the agent on the iron steel surface.

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]****[0001]**

**[Industrial Application]** This invention relates to the rustproofing agent on the front face of steel which forms an effective rust-proofing coat by applying to a steel front face.

**[0002]**

**[Description of the Prior Art]** In order to improve adhesion with a substrate, and rust-proofing nature on the occasion of paint also with the comparatively new rust which carries out rusting especially with the various products and the structure by iron steel materials at the time of manufacture, it is necessary to fully remove.

**[0003]** Since those rust removal approaches were conventionally based on the mechanical means by shot blasting, a wire brush, etc., the workability from a work environment side was bad, and an improvement was desired also from process compaction and a cost side.

**[0004]** Moreover, the bolt nut of the application which cannot perform rustproofing, such as galvanization and paint, with the bolt nut of steel was using slushing oil, rust-proofing paper, etc. conventionally. However, all had the fault that the rust-proofing effectiveness was short, under the humid environment.

**[0005]**

**[Problem(s) to be Solved by the Invention]** In view of said technical level, since this invention is not desirable on work environment, the conventional derusting activity by shot blasting, a wire brush, etc. It is going to offer the rustproofing agent which carries out under coat paint, excludes the conventional derusting activity after carrying out drug solution processing from on rust about rust (what carried out rusting in progress of less than 0.5 years under natural environment) with a comparatively new rust generating situation, and makes good adhesion with a substrate, and rust-proofing nature.

**[0006]**

**[Means for Solving the Problem]** It is a rustproofing agent on the front face of steel characterized by this invention coming to blend carboxyl group content compound [ which are chosen from a glycolic acid, a gluconic acid, a lactic acid, a malic acid, a formic acid, a citric acid, a tartaric acid, a glutaric acid, succinic acids, and those salts to tannic-acid water-solution 15 - 25wt% / one or more sorts of ] 4 - 10wt%, and acrylic ester-styrene copolymerization resin 20 - 30wt%.

**[0007]** Ammonium, a potassium, and sodium salt can be used as a salt of said carboxyl group content organic acid used for this invention.

**[0008]** Since spreading nature not only worsens, but the viscosity of a rustproofing agent will become high too much and the amount of [ of a tannic acid ] insoluble solution will deposit if the compactness of a rust-proofing coat and glossiness are less than [ 15wt% ] inferior in the concentration of a tannic acid if the component and concentration of the rustproofing agent of this invention are explained in full detail, the rust-proofing force is missing and 25wt(s)% is exceeded, it may be 15 - 25wt%.

**[0009]** the concentration of said carboxyl group content compound (organic acids and those salts) added as an adhesion promotion agent with the compactness of a rust-proofing coat, and a metal base -- less

than [ 4wt% ] -- the compactness of a rust-proofing coat, glossiness, and adhesion with a metal base -- being inferior -- the rust-proofing force -- missing -- 10wt% -- since there is no effectiveness beyond it even if it exceeds, it should make the range of 4 - 10wt%.

[0010] Moreover, since the viscosity of a rustproofing agent will become high too much and spreading nature will worsen if the effectiveness over the reinforcement and adhesion of a rust-proofing coat is small and exceeds 30wt% less than [ 20wt% ], concentration of said acrylic ester-styrene copolymerization resin (molecular weight: about 300,000-400,000) should be made the range of 20 - 30wt%.

[0011] When spreading on the steel front face of the rustproofing agent of this invention has a large processing object, a spray or the brush performs, and when small, it may be directly immersed in a rustproofing agent.

[0012] Moreover, if the processing temperature at the time of rustproofing is extent which a rustproofing agent does not freeze, it is usable enough, but since formation of the rust-proofing coat by the dissolution of rust is promoted so that the temperature of a rustproofing agent is high, when the steel front face of a processing object is carrying out rusting, in spreading of a rustproofing agent, about 20-40 degrees C is desirable.

[0013]

[Function] The rustproofing agent of this invention becomes unable to blend one or more sorts of carboxyl group content compounds chosen as a tannic-acid water solution from the glycolic acid, the gluconic acid, the lactic acid, the malic acid, the formic acid, the citric acid, the tartaric acid, the glutaric acid, the succinic acids, and those salts of the specified quantity, and can make the rust-proofing coat which got each other used on a steel front face very as well as acrylic ester-styrene copolymerization resin and which was chemically excellent in a stable tannic-acid iron subject's rust-proofing force form.

[0014] The process which forms such an effective rust-proofing coat is explained. By using together one or more sorts chosen as a tannic-acid water solution from the organic acids and those salts of said carboxyl group content, compared with the rustproofing agent which does not use together these organic acids and those salts at all, the rust-proofing coat is precise, is glossy and has the operation which the adhesion over a metal base is raised much more, and heightens the rust-proofing effectiveness. Thus, although it is not clear about the device which heightens the rust-proofing effectiveness much more by using together organic acids and those salts, what is precise and is improved by the rust-proofing coat of the strong tannic-acid iron subject of adhesion is presumed at the same time a steel front face dissolves in homogeneity according to the synergistic effect with a tannic-acid water solution.

[0015] May set the acrylic ester-styrene copolymerization resin in the rustproofing agent of this invention in a water solution, emulsion-ize it, and since it is equalized Said resin and since [ which got each other used very well ] it is a mixed coat with stable tannic-acid iron chemically, the rust-proofing coat formed in a steel front face is presumed to be what raises the adhesion over a metal base further much more, and also raises the rust-proofing force further when a rust-proofing coat carries out desiccation solidification. Furthermore, when painting later, a coating can form the paint film excellent in concordance or the adhesion which becomes empty.

[0016]

[Example] After applying the rustproofing agent shown in Table A to what gave rust (it installs for two months on the roof of the beach, and seasons naturally after rusting), and each test piece front face which does not give rust and forming a rust-proofing coat in a test piece (quality of the material: hot rolled steel plate, dimension: 100mmx70mmx2.3mm) front face, it was left for two days and the formation situation of a rust-proofing coat was observed after seasoning naturally the rust-proofing film.

[0017] The rust-proofing force effectiveness trial performed after that was carried out by the following approach. The test piece after rust-proofing coat formation was put into the humidity cabinet test machine, the rust-proofing force effectiveness under the test condition of Table A was judged from the rust generating situation of 96 hours, and the result like test number [ of the example of Table A ] (2) - (28) was obtained. Moreover, the test number (1) of Table A showed the rust-proofing force

effectiveness only by the tannic-acid water solution as an example of reference.

[Table 1]

表 A

試験番号	防錆処理前の試験片表面の錆発生の有無	防錆処理剤（エマルジョン水溶液）の組成（wt%）				防錆処理後の試験片表面の防錆皮膜形成状況	湿度試験条件	防錆力試験結果
		タンニン酸	有機酸	有機酸塩	アクリル酸エチル－スチレン共重合樹脂			
参考例	(1)	20	—	—	—	緻密性及び密着性に欠け、指で触れると皮膜はとれてくる。	試験時間：9 6 hr 試験温度：49±1℃ 相対湿度：95%以上 空気流量：886.5±110.5 ℓ/h 試験機：スガ試験機株式会社（型式：CT-2）	×
	(2)	20	グリコール酸	5	—			○
実施例	(3)	20	グリコール酸	5	30	光沢のある黒紫色の樹脂含有のタンニン酸鉄主体の緻密で密着性の強い防錆皮膜が形成されている。		○
	(4)	20	乳酸	5	30			○
	(5)	20	リンゴ酸	5	30			○
	(6)	20	ギ酸	5	30			○
	(7)	20	クエン酸	5	30			○
	(8)	15	グリコール酸	5	30			○
	(9)	10	グリコール酸	5	30			△
	(10)	20	グリコール酸	5	25			○
	(11)	20	グリコール酸	5	20			△
	(12)	20	酒石酸	5	30			○
	(13)	20	グリコール酸	5	30			○
	(14)	20	コハク酸	5	30			○
	(15)	15	グリコール酸	3 グリコール酸 2 アソニコム	30			○
	(16)	20	—	グリコール酸 5 アソニコム	30			○
	(17)	20	—	クエン酸 5 アソニコム	30			○
	(18)	15	—	クエン酸 5 ナトリウム	30			○

[Table 2]

表 A (続き)

試験番号	防錆処理剤の試験の 前表面の錆発生の有無	防錆処理剤 (イマルジョン水溶液) の組成 (wt%)				防錆処理後の試験片 表面の防錆皮膜形成 状況	湿潤試験条件	防錆力 試験結果
		タンニン酸	有機酸	有機酸塩	7グリコール酸エポキシ樹脂共重合樹脂			
(19)	有	10	グリコール酸 5	—	30	試験片表面の発生錆 (Fe <sub>2</sub> O <sub>3</sub> ) はほぼ完全に溶解されて光沢のある黒色の樹脂含有のタンニン酸鉄主体の緻密で密着性の強い防錆皮膜が形成されている。	試験時間 : 96hr 試験温度 : 49 ± 1 °C 相対湿度 : 95% 以上 空気流量 : 886.5 ± 110.5 l/h 試験機 : スガ試験機械 製 (型式 : CT-2)	△
(20)		15	グリコール酸 5	—	30			○
(21)		20	グリコール酸 5	—	30			○
(22)		20	グリコール酸 3	—	30			○
(23)		20	グリコール酸 5	—	2ヶ			○
(24)		20	グリコール酸 5	—	20			△
(25)		20	グリコール酸 3	グリコール酸 アモニウム 2	30			○
(26)		20	クエン酸 3	グリコール酸 アモニウム 2	30			○
(27)		20	クエン酸 3	クエン酸水素 アモニウム 2	30			○
(28)		20	クエン酸 3	クエン酸 アモニウム 2	30			○

## 防錆力試験結果

- : 防錆皮膜の光沢性は無くても鉄錆の発生は全く見られない  
△ : 防錆皮膜表面があれど若干の鉄錆発生が見られる  
× : 防錆皮膜が殆んど無くなって全面に強く鉄錆発生が見られる

[0018]

[Effect of the Invention] The following effectiveness is done so by rustproofing agent use of this invention.

(1) The tannic-acid iron subject of stable resin content is chemically precise only by applying to a steel

front face, and since the rust-proofing coat excellent in the strong rust-proofing force of adhesion is formed, rust generating of the various products which consist of iron steel materials, the structure, the bolt nut of accessories, etc. can be controlled.

[0019] (2) About rust (what carried out rusting in progress of less than 0.5 years under natural environment) with the comparatively new rust generating situation on the front face of steel, while dissolving rust effectively only by applying the rustproofing agent of this invention, the rust-proofing coat which converted into the rust-proofing coat of the tannic-acid iron subject of stable resin content chemically, and was excellent in the stronger rust-proofing force of precise adhesion can be formed.

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[Translation done.]